

Figure 1-6

**Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q**

**November 29, 1961
Aerial Photography
Approximate Scale 1"=600'**

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
(TS-PIC-83003)
Environmental Photographic Interpretation Center
Environmental Monitoring System Laboratory

U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018



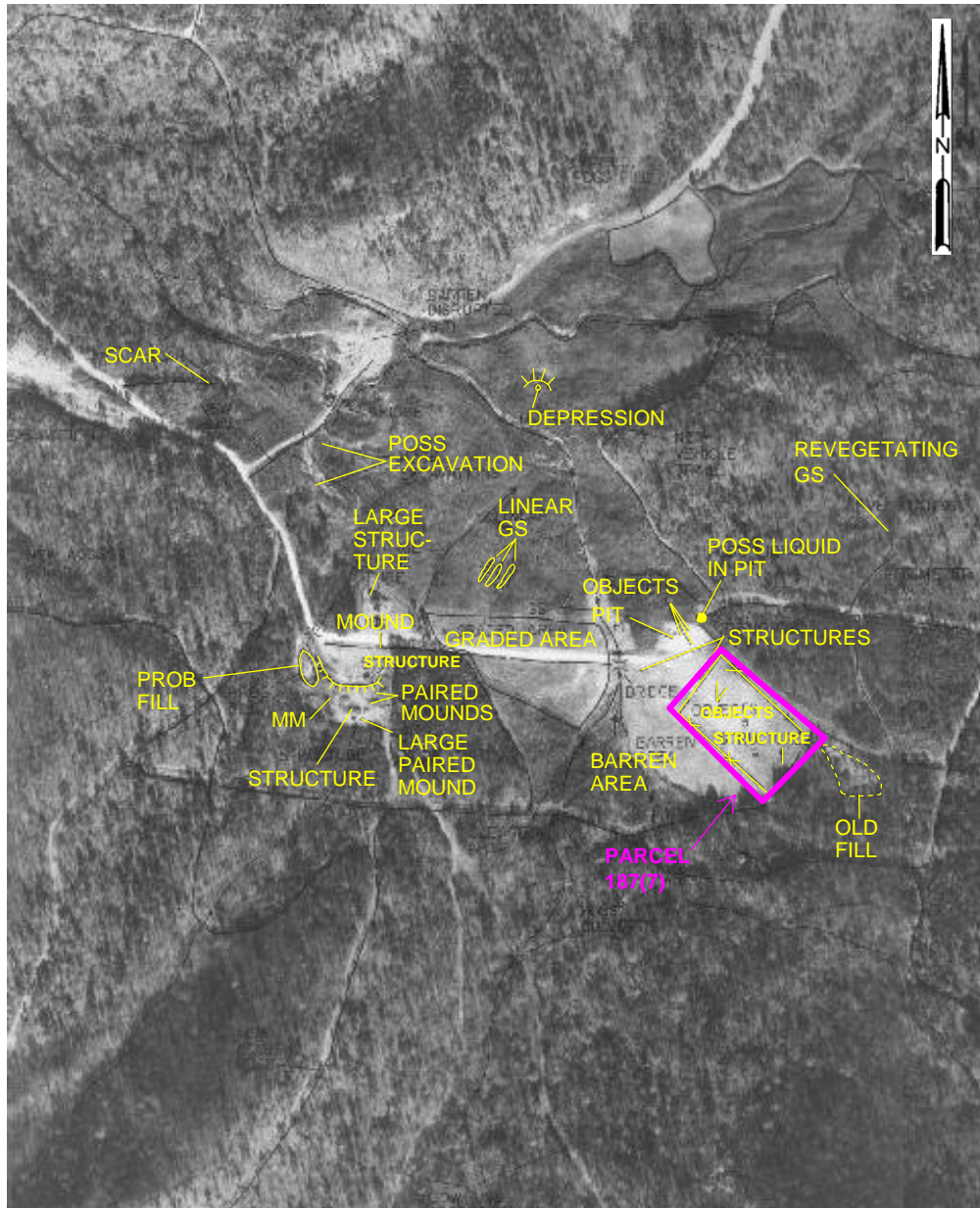


Figure 1-7

**Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q**

**November 20, 1969
Aerial Photography
Approximate Scale 1"=600'**

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
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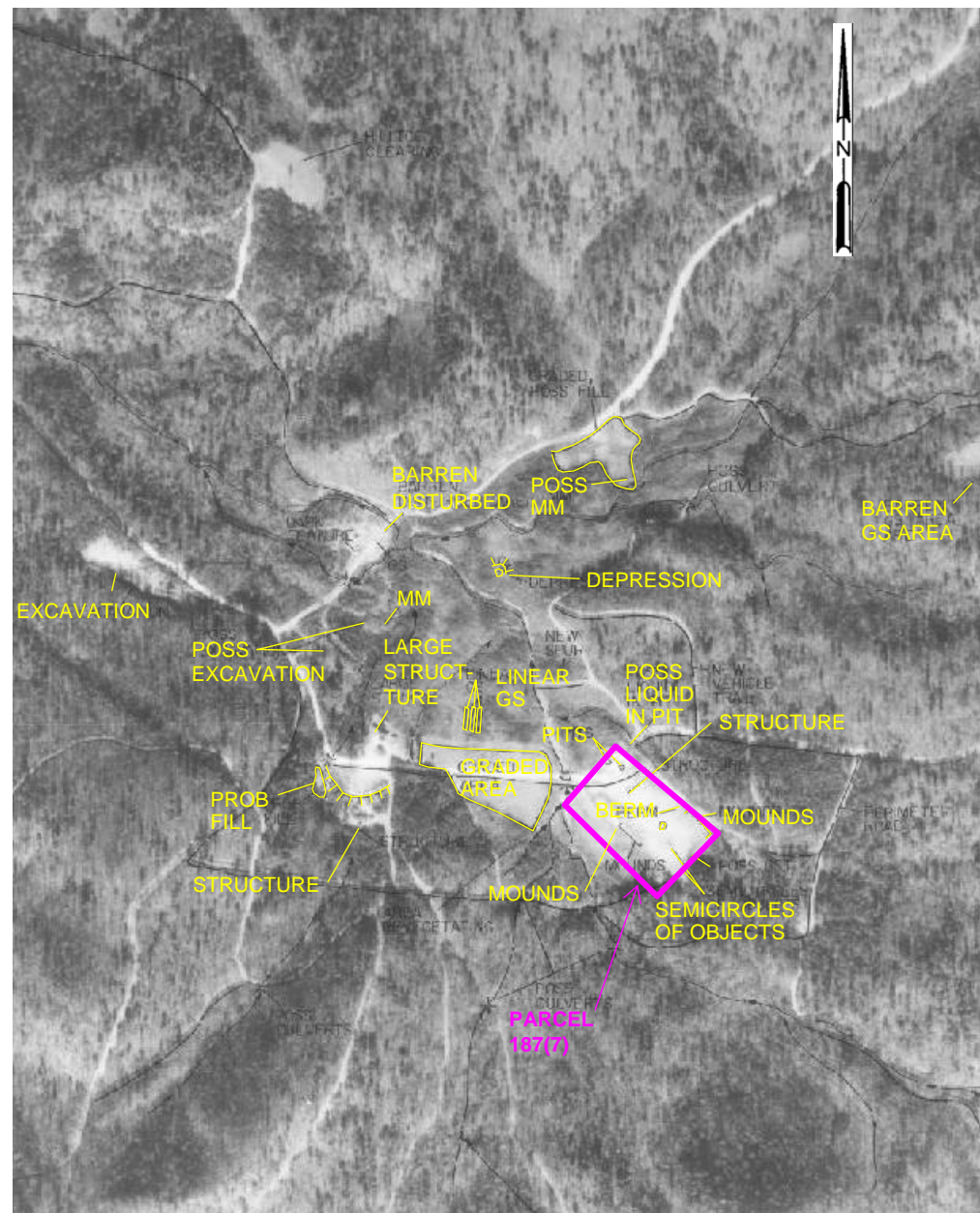


Figure 1-8

**Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q**

**January 8, 1972
Aerial Photography
Approximate Scale 1"=600'**






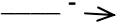
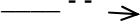

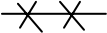
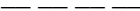
Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
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Mobile District
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Table 1-1

**Legend for Aerial Photographs
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

T	Tank
GS	Ground Scar
MM	Mounded Material
SL	Standing Liquid
GST	Ground Stain
	Culvert
	Wetlands
	Access Road
	Depressions
	Ditched Drainage
	Drainage
	Intermittent Drainage
	Escarpment
	Fence
	Historical Boundary

range is concentrated around the light-toned barren strip, which borders the western end of the range. This strip probably serves as the firing area. Two structures, possibly used for storage or observation, stand near the center of the strip. Four or five rectangular objects are present south of the structures. A larger, indistinct object lies at the southern end of the strip; a subtle, linear ground scar (not annotated) is visible just north of this object. A possible utility easement leads from the west to the center of the barren strip. A primitive vehicle trail is visible over this feature. Seven parallel rows of trees stand immediately east of the barren strip; the intervals between the rows probably serve as firing corridors. Trail-like surface markings lead eastward from the intervals and continue across the length of the range. The cause or function of these markings is not clear.

Dark-toned areas are present along the drainage bed in the northwest section of the tree row area. Surface wetness or dense ground vegetation may have caused this tonality contrast. Three rectangular objects (or possible small structures) are noted to the north, along the range border. A primitive trail from the range access road leads to these objects. A barren area is cut into a hillside south of the tree rows; a number of small dark objects are scattered across its western surface. Vehicle tracks from the aforementioned barren strip lead to this area. The eastern half of the range is largely grass-covered; however, the numerous barren patches here give the area a mottled appearance. A number of short ground scars (typical examples of these are annotated) are scattered across this area in random directions. These scars consist of a dark, shallow trench between two light-toned, sometimes mounded streaks.

Many small objects, several feet in length, are scattered across the eastern range area. A concentration of these objects is shown at the end of a probable vehicle trail, which follows a drainage bed into the area. Four conical mounds, possibly used for camera observation, stand at the eastern end of this area. A small dark spot or object is visible atop each of the mounds. These mounds were observed in a recent site walk by IT. Three objects lie adjacent to the creek bed northwest of the range. The two southern objects are light-toned and indistinct; the northern object appears to be cylindrical. No vehicle access to these objects is evident.

October 17, 1954, Figure 1-4. Changes at the Ranges near Training Area T- 24A indicate that the area no longer serves as a firing range and may now support disposal activities. The barren strip visible along the western end of the site in 1949 is now partially overgrown, and the two structures previously noted here have been removed. A number of possible small objects are scattered over the center of the old strip; however, none of the other objects observed in 1949 are

visible. The barren area isolated near the southwest corner of the site is also in disuse. Activity is now concentrated across the western/central area of the site. Several tree rows that previously stood here have been cleared, and the surface is largely barren and scarred. Access to this area is provided by the improved roadway which approaches the Ranges Near Training Area T-24A from the northwest. Two drainage ditches border the southern and western sides of the area; the western ditch is culverted beneath the entrance roadway.

The western section of the site is barren and slightly elevated, indicting possible filling activity. A very light-toned, crescent-shaped ground scar is present across the center of this section. Numerous mounds, including a pair of abutting identical mounds, which form a single "paired mound" (not annotated), are present south of the scar. Several small paired mounds appear on the scarred area east of the possible fill. Two larger sets of paired mounds are also present on this area. The surfaces of these are probably vegetated. A scarred, barren area is noted along the roadway to the north of this area. The central section of the site is also barren and scarred. A culverted earthen bridge passes over the drainage bed on the west side of this section to provide vehicle access. Numerous crater-like depressions are visible here; the interiors of these depressions are light in tone and therefore are possibly not used for burning. A number of the aforementioned various-sized paired mounds are present in the central section; most of these are unvegetated.

An elevated and grade-scarred area, possibly a fill, is noted in the east central site section. Dark mounded material is visible on the northeast surface of this area. Level circular scars, possibly filled pits, are present adjacent to the southwest side of the fill. A probable drainage ditch is cut along the south side of this area; the ditch appears to lead westward. The eastern portion of the Ranges Near Training Area T-24A has largely revegetated, and only remnants of several of the trench-like ground scars remain visible. The small objects and conical mounds here in 1949 are no longer evident. Vehicle tracks lead onto this area from the more active western sections. Drainage patterns around the site are similar to those in 1949, although the seasonal foliage canopy has obscured their details. Drainage through the site has been somewhat altered, due in part to the changing site activities.

A new roadway has been formed northwest of the site. A small bridge accommodates the road over the creek bed. A small spur of the road leads to a low barren area south of the creek. The possible mounded material and assorted objects observed in this area in 1949 are no longer present.

December 21, 1957, Figure 1-5. Remnant features of the old firing range have become less evident, while development of possible disposal areas within the Ranges Near Training Area T-24A continues. The previous barren strip and the smaller barren area have now revegetated. The possible objects observed on the strip in 1949 and 1954 are no longer present. A perimeter road now surrounds active areas of the Ranges Near Training Area T-24A. Main access to the site continues to be from the northwest; however, new roads provide secondary access from the south and east. The crescent-shaped scar remains in the western section of the site. The earlier possible fill area around the scar is grass-covered; the resulting contrast reveals that the scar is an escarpment, sloping down to the south. A possible ditch is present along the south side of the scar. The semicircular area north of the scar is level and somewhat elevated above the earlier fill. The mounds remain south of the scar. The area east of the possible western fill area has partially revegetated. Two of the paired mounds remain visible here. Three shallow trenches are noted along the perimeter road, northeast of the mounds. The function of these trenches is undetermined.

The drainage ditch system around the western section of the site remains intact. Partial surface revegetation has given the central section of the Ranges Near Training Area T-24A an overall darker tone. Several of the crater-like depressions noted in 1954 have apparently been filled, while several new depressions have become evident. The depressions remain empty. Three paired mounds are noted southeast of the depressions. A linear wall-like feature is now present across the northwest end of the central site section. A shallow trench may parallel the northwest face of the feature, and low mounds of indistinct light-toned material are scattered to the west. The small, earlier possible fill remains east of the central site section. The surface here exhibits less scarring and is somewhat darker in tone, possibly due to partial revegetation. Several crater-like depressions and a paired mound are now present in this area. An escarpment has been cut into the elevated area along the south side of the fill. A shallow trench has formed parallel to the northern face of the escarpment and appears to connect with the adjacent drainage ditch.

Two shallow trenches are present along the vehicle trail that intersects the eastern perimeter road. These trenches are identical to those noted in the western section of the site. The eastern end of the site is heavily vegetated and appears to be in disuse. Excluding the aforementioned new access roads, features external to the Ranges Near Training Area T-24A are basically unchanged. Several small possible objects are present on the barren area that is adjacent to the creek bed northwest of the site.

November 29, 1961, Figure 1-6. Roads around the Ranges Near Training Area T-24A have been markedly improved, and new access routes now serve the southwest and southeast corners of the site. The prominent crescent-shaped escarpment remains in the western section of the site. Two objects or mounds and indistinct mounded material are present on the elevated, semicircular barren and scarred area north of the escarpment. A scarred, probable fill area is noted immediately west of the escarpment. The fill has eliminated the previous ditch through this area. Paired mounds remain on the now barren area south of the escarpment. Activity here appears to be centered around the larger, southernmost mound; dark material is mounded to the west of it. The improved southern access road into the site now extends directly to the western site section. The area east of the western section is heavily vegetated and apparently inactive. The three trenches previously observed along the perimeter road north of this area are no longer evident. The central site section exhibits new surface scarring and disruption. The wall-like feature remains; however, the possible parallel ditch noted in 1957 is not evident. Four revegetating depressions are visible southeast of the wall. The area immediately around the depressions has a thick vegetation cover. The paired mounds (not annotated) in this area have also vegetated.

Additional depressions are noted on the possible fill area to the east. The surface of this area exhibits new scarring. The escarpment and adjacent shallow trench (not annotated) remain visible along the south side of the area; the ditch previously connected with the trench is no longer evident. A vehicle trail leads northward from the possible fill area to a scarred clearing north of the site perimeter road. Small objects are scattered adjacent to the clearing. The far eastern end of the site (outside the perimeter road) continues to appear inactive. The trenches previously noted along the vehicle trail into this area are no longer visible. The small bridge northwest of the site appears to be out. None of the objects observed in the adjacent clearing in 1957 are evident.

November 20, 1969, Figure 1-7. Extensive changes have occurred within the Ranges Near Training Area T-24A and across the associated area to the north. Access into the Ranges Near Training Area T-24A is similar to that noted in 1961; however, the perimeter road and southern entrance routes are darker in tone, possibly due to reduced use. The perimeter road has been delineated to increase clarity. New access roads from the south and west augment the existing routes serving the western site section. The active western section of the Ranges Near Training Area T-24A has a partial grass cover. The crescent-shaped escarpment here remains visible, although it appears to have eroded and is less prominent. A rectangular structure is noted on the

edge of this feature. A mound stands on the area north of the escarpment. The objects seen here in 1961 have been removed. The small fill area immediately west of the escarpment is highly disrupted and may have been excavated. A small possible drainage ditch flows from the fill area into the adjacent culvert. The assorted paired mounds and mounded material remains south of the escarpment. A new small structure is present immediately south of the large mound.

The central section of the site has been cleared and now has a low vegetation cover. The northern portion of this area is lighter in tone and exhibits subtle grading scars. The central drainage route through the site has been altered within this cleared area. A perimeter road bridge has been constructed over the drainage bed. A small structure is present just southeast of the bridge. Heavy surface disruption and scarring are noted along the stream bed north of the bridge.

The site section east of the central drainage bed is now barren and graded smooth. A fence has been erected around the more elevated eastern half of this section. The ground surface inside the fence is light-toned. Two crater-like depressions are present here; the interiors of these may be discolored or contain material. Two small objects are present northwest of the larger depression. Two structures are noted adjacent to the fenced area. An indistinct white object or ground scar (not annotated) is visible at the fence gate.

A very light-toned barren area is now present northwest of the fenced area across the site perimeter road. An elliptical pit that may contain dark material or liquid is present in this area. Unidentifiable objects are scattered east of the pit. An irregular pit, possibly containing liquid, is present northeast of this barren area. The old fill area in the eastern end of the site is now revegetating. The vehicle trail leading north from the fill area remains visible; however, the scarred area at its terminus is also revegetating. North of the Ranges Near Training Area T-24A, a large dogleg shaped area has been denuded of all trees and now has a low vegetation cover. This area is roughly bounded by the developed roadway to the west, a new vehicle trail to the east, and the perimeter road to the south. A large rectangular structure, possibly a building, has been constructed in the southwest corner of the denuded area. A white, "L"-shaped appendage (possibly an earthen berm) is present off the east side of this structure. A drainage channel is visible east of the structure.

Two scarred areas, possibly excavations, are noted north of the large structure. Linear ground scars, possibly associated with the graded area to the south, are visible east of the structure.

Drainage flow is interrupted and altered by a barren and disrupted site, possibly a fill area, on the west side of the denuded area. A new road from the original access roadway accesses this site. A bridge carries the road over the drainage bed immediately south of the barren, disrupted area. A crater-like depression is present near the center of the large denuded area. A curved escarpment is noted north of the depression. The low area north of the escarpment face is light in tone. A smoothly graded, possible fill site is present in the northern end of the denuded area and is contiguous with the bordering roadway. A vehicle trail emanates from the eastern side of this site. An excavation is noted at the left side of the photo, along the south side of the access road. A vehicle trail leads eastward from the opposite side of the access road to a small ground scar.

January 8, 1972, Figure 1-8. The Ranges Near Training Area T-24A and the external areas retain their basic 1969 configuration. Access into the area is unchanged. The perimeter road around the site is again delineated for clarity. The western section of the Ranges Near Training Area T-24A appears to be falling into disuse. The crescent-shaped scar here continues to erode and is edged with vegetation. The structure adjacent to the escarpment in 1969 is gone. More vegetation covers the ground and assorted mounds south of the escarpment. The small structure remains in the southern end of this area. The probable small fill area west of the escarpment is also revegetating; the adjacent drainage ditch remains visible. The cleared area at the central section of the site is now covered with shrubs and small trees. The graded area to the north of this is unchanged. The fence has been removed from the barren elevation to the east. The surface here remains scarred. The large depression seen here in 1969 lies partially obscured at the center of the area. A semicircle of small objects is present on the approximate location of a previous (1969) depression. The surface here is now level and dark in tone. A larger semicircle of objects stands near the southern corner of this area. A possible ground stain is noted northeast of this second group. Rows of small mounds are present along the northeastern and southwestern sides of the elevation; the former are larger and more distinct. Small objects or possible debris (not annotated) are present southeast of this group, while a small earthen berm is noted to its northwest.

A second pit has been added in the light-toned, barren area, located northwest of the elevation across the Ranges Near Training Area T-24A perimeter road. Indistinct material (not annotated) is present around the eastern end of this area. The irregular, possibly liquid-filled pit remains to the northeast.

Shrub vegetation now covers portions of the large, previously denuded area north of the Ranges Near Training Area T-24A. Limited development of this area continues. The large structure remains in the southwest corner of the denuded area. The eastern end of the structure has been enlarged, and a small extension projects from its north side. The possible berm remains off the east side. A smaller structure (not annotated), possibly a shed, stands to the east. The two possible excavations north of the large structure have revegetated. Indistinct mounded material is present at the smaller, northern excavation.

The linear ground scars east of the large structure are also revegetating. A new road spur, possibly a prelude to future construction, leads to the creek bed east of the scars. Drainage patterns through the denuded area appear static. The barren area associated with altered drainage flow at the west side of the area remains disrupted. New ground scarring is visible across its eastern surface, and a mounded dark feature is present in the west. Access to this area is unchanged.

The small depression and escarpment near the center of the denuded area are unchanged. The graded possible fill site to the north now has a partial low vegetation cover, which gives the surface a mottled appearance. Possible mounded material is present on the southeast extension of this site. A vehicle trail leads eastward from the site to a barren and scarred hilltop area. The excavation remains west of the denuded area, along the original access road. A possibly vegetated hilltop clearing is noted to the north of this. The use of this clearing is unknown.

1.5 Regional and Site-Specific Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-grey siltstone and mudstone. Massive to laminated, greenish-grey and black mudstone makes up the Nichols Formation with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The undifferentiated unit is comprised of coarse-grained and fine-grained units. The coarse-grained facies appear to dominate the unit and consists primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east and southwest of the Main Post and consists of interlayered bluish-grey or pale yellowish-grey sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady

Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne 1999, personal communication).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southwest of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984). The Rome Formation consists of variegated thinly interbedded greyish-red-purple mudstone, shale, siltstone, and greenish-red and light grey sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-grey, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium grey, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark grey, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark grey, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-grey to black shale and graptolitic shale with localized interbedded dark grey limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of

interbedded red sandstone, siltstone, and shale with greenish-grey to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-grey limestone with abundant chert nodules and greenish-grey to greyish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian Age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

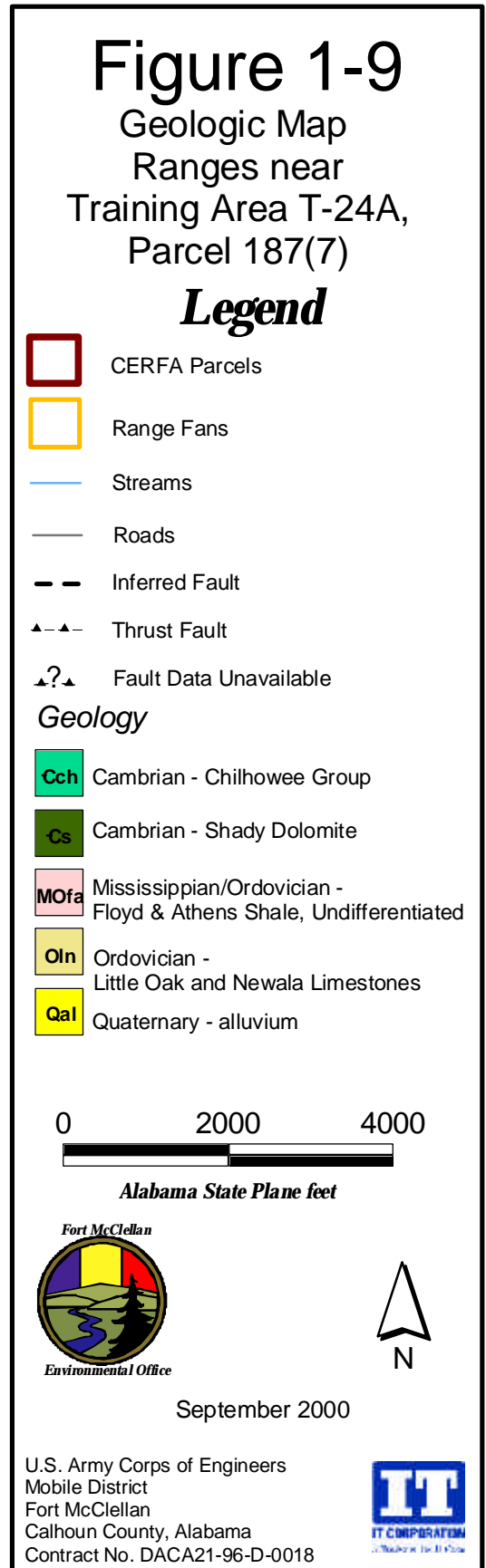
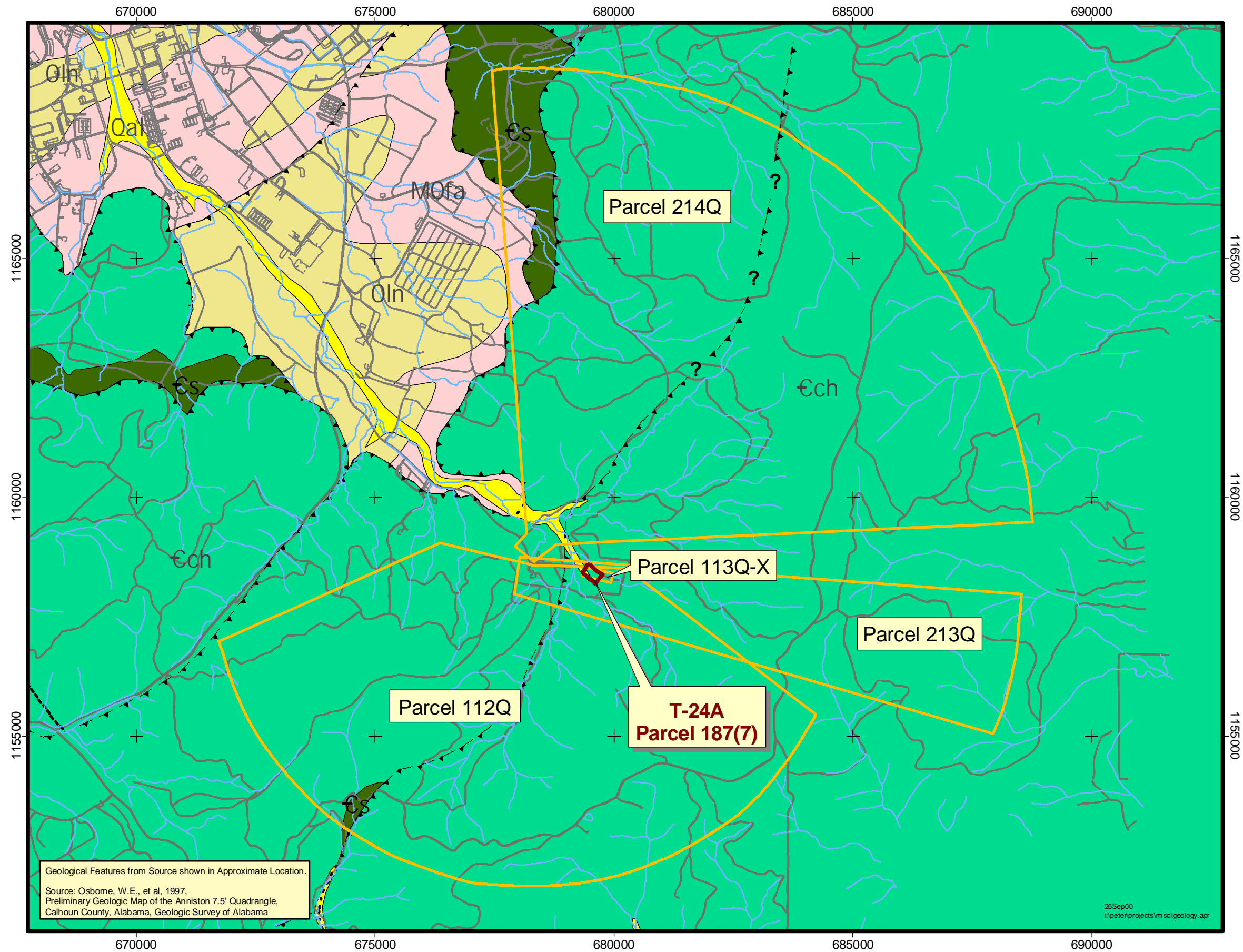
A north-south trending fault trace was mapped by Osborne (1999) to the west of Parcel 187(7) (Figure 1-9). This fault is mapped within the Chilhowee Group, undifferentiated, and appears to be a splay of the Jacksonville Fault mapped approximately 2,000 feet northwest of Parcel 187(7). During site reconnaissance by IT, the only visual evidence supporting the presence of the fault

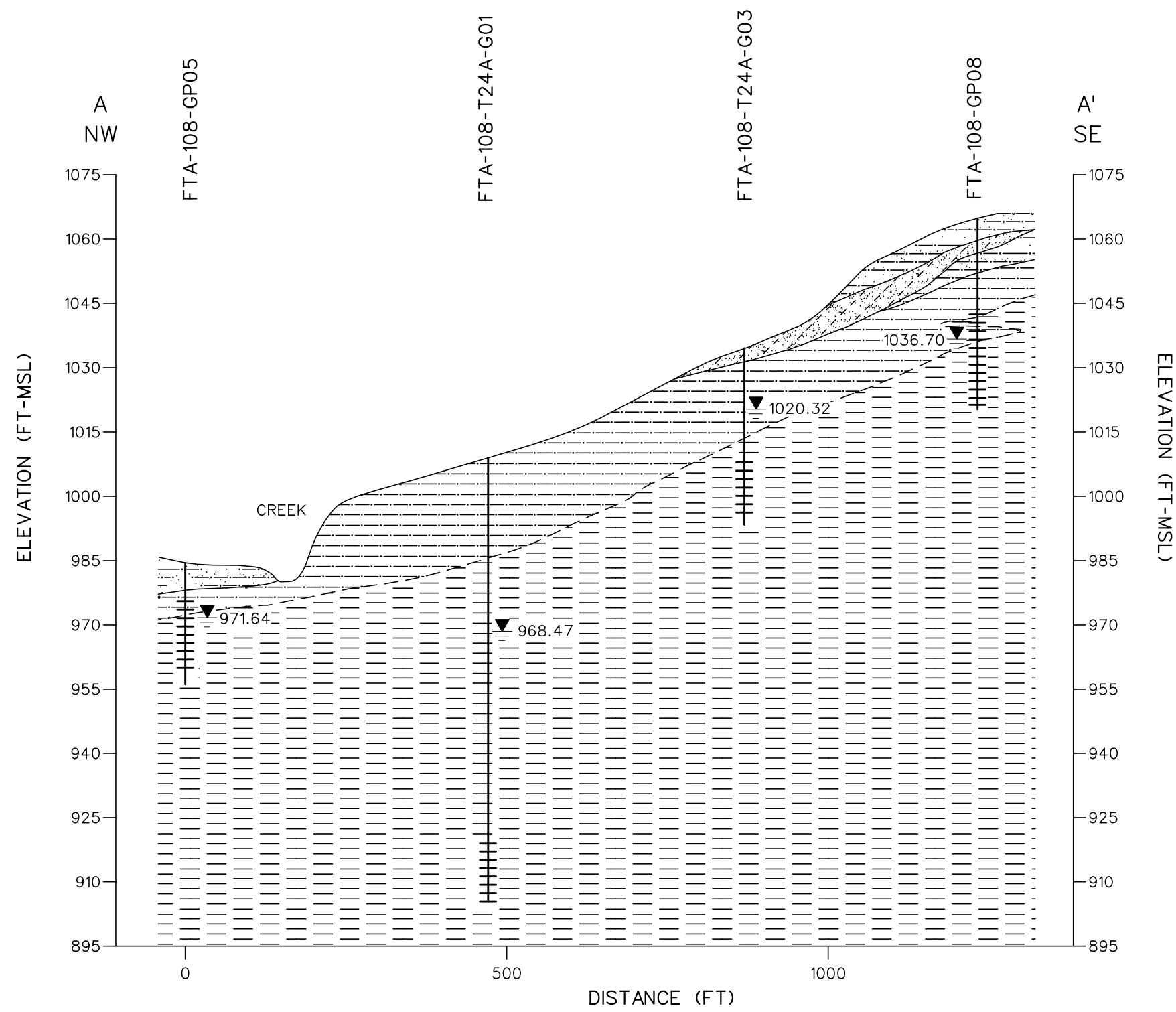
was observed in an outcrop of deformed shale and siltstone beds along the north-south trending creek to the west of Parcel 187(7).

The geology in the vicinity of Ranges Near Training Area T-24A was assessed using lithologic logs prepared by Science Applications International Corporation (SAIC) during the supplemental RI monitoring well installation program and lithologic logs prepared by IT during the SI activities at Parcels 88(6) and 108(7). Lithologic logs are included in Appendix A. A geologic cross section using the lithologic data from the previous investigations is shown in Figure 1-10. The cross section shows that, in general, the sediments at the Ranges Near Training Area T-24A site consist of brown sandy silt to silt, with interbedded red sandy clay. The silt grades to light-grey to yellowish-brown weathered shale. The shale grades to grey with depth. The silt and clay are present at higher elevations to the southeast of Ranges Near Training Area T-24A, pinching out at lower elevations. However, pale-brown to tan shale and siltstone were observed in the north-south trending stream channel west of Parcel 187(7). Bedrock and residuum are apparently associated with the Chilhowee Group, undifferentiated as mapped by Osborne and Szabo (1997) (Figure 1-9). Detailed site-specific geology of Ranges Near Training Area T-24A will be documented during the proposed supplemental RI activities.

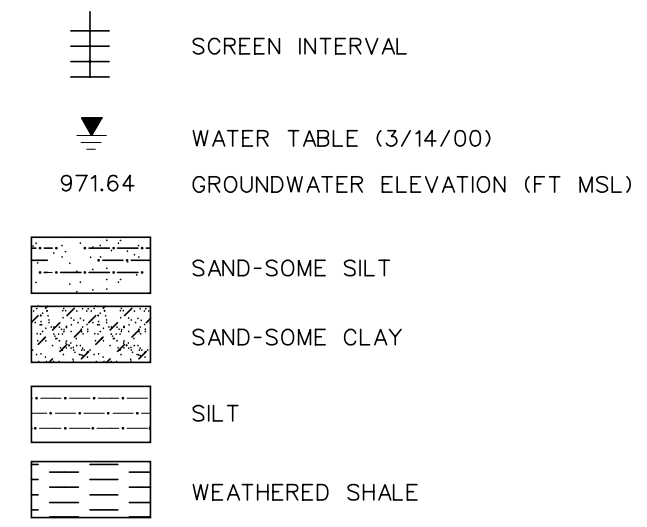
1.6 Regional and Site-Specific Hydrogeology

A hydrogeologic assessment of regional groundwater flow patterns to determine the approximate groundwater flow directions with respect to the various geologic units, surface water bodies, and known subsurface conduit (thrust fault) features in the area surrounding FTMC and Pelham Range has not been conducted. Aquifers in the vicinity of FTMC and Pelham Range are developed in residuum derived from bedrock decomposition; within fractured bedrock; along fault zones; and from the development of karst frameworks. Although detailed characterizations of groundwater movement in the region have not been conducted, the ultimate movement of groundwater may be estimated to be toward major surface water features. However, because of the impacts of differential weathering, variable fracturing, and the potential for conduit flow development, the use of surface topography as an indicator for groundwater flow direction in the area must be used with caution. Areas with well-developed residuum horizons may subtly reflect the surface topography, but the groundwater flow direction also may exhibit the influence of pre-existing structural fabrics or the presence of perched water horizons on unweathered ledges or boulders (SAIC, 1998).



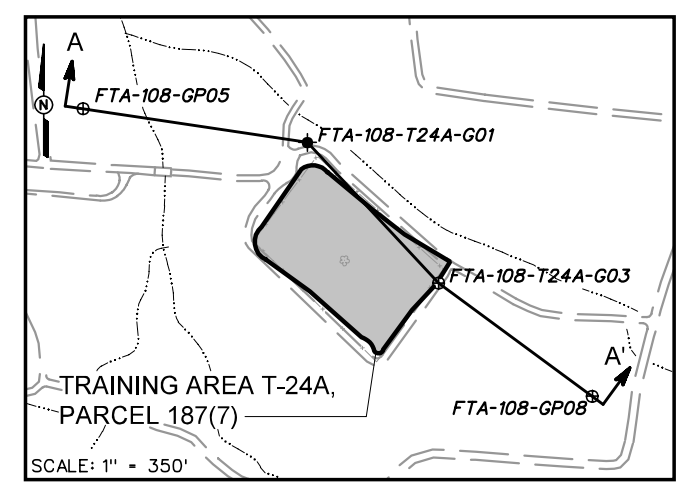


LEGEND



NOTE:

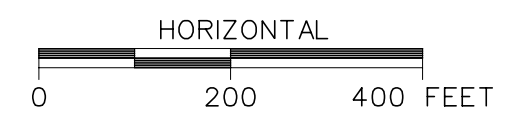
1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



CROSS SECTION LOCATION

FIGURE 1-10
GEOLOGIC CROSS SECTION A-A'
RANGES NEAR TRAINING
AREA T-24A
PARCELS 187(7), 112Q, 113Q-X, 213Q
AND 214Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018



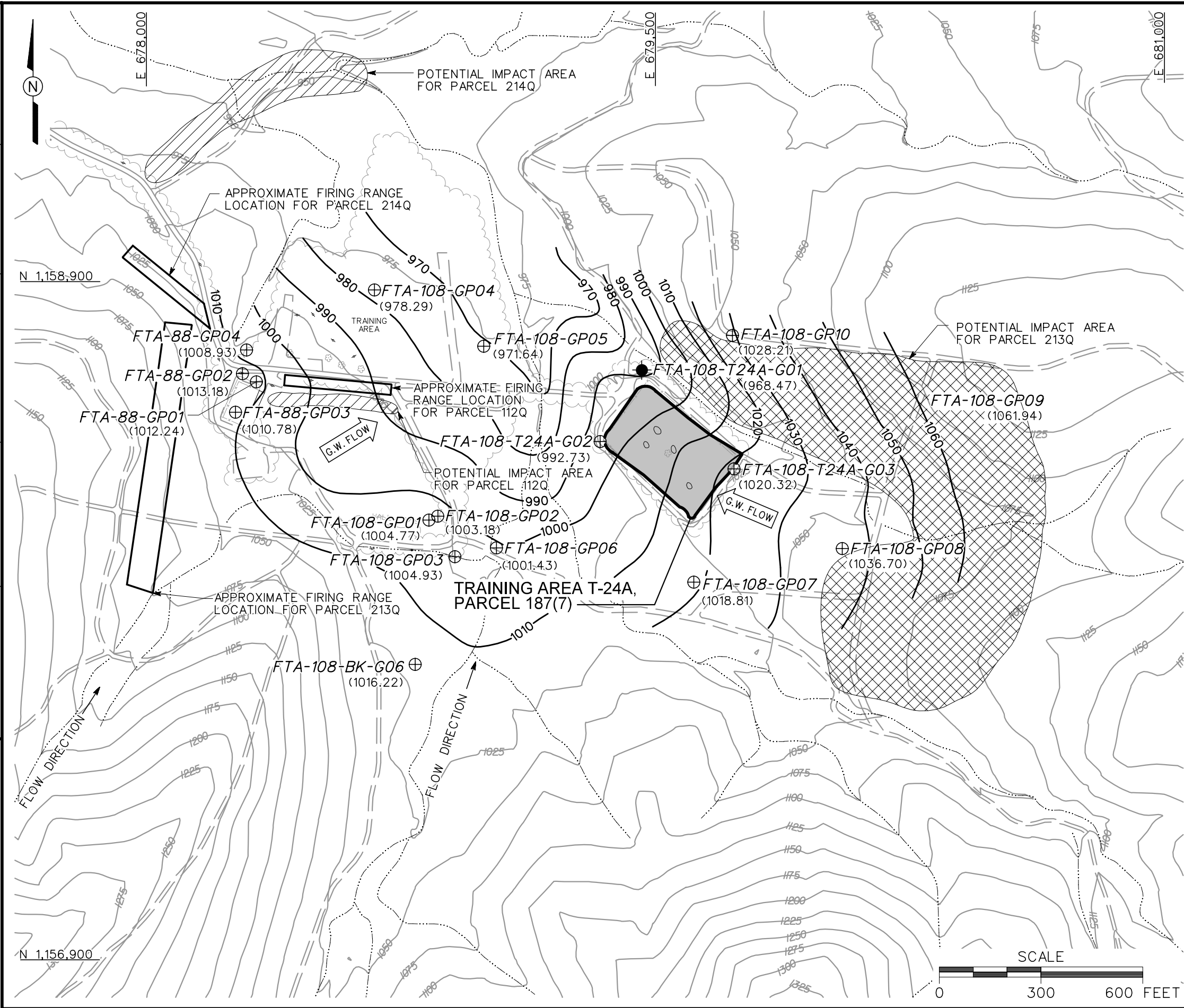
Precipitation in the form of rain is the source of most groundwater recharge in Calhoun County. The thrust fault zones typical of the county form large storage reservoirs for groundwater. Precipitation and subsequent infiltration provide recharge to the groundwater flow system. Points of discharge occur as springs, effluent streams, and lakes. Shallow groundwater on FTMC occurs principally in the residuum developed from Cambrian sedimentary and carbonate bedrock units of the Weisner Formation and locally in lower Ordovician carbonates. Bedrock permeability may be locally enhanced by fracture zones associated with thrust faults and by the development of solution (karst) features (predominantly on Pelham Range).

Groundwater elevations in the vicinity of Ranges Near Training Area T-24A were calculated by measuring depths to groundwater on March 14, 2000, relative to the top-of-casing elevations in each of the 18 monitoring wells associated with Parcels 88(6) and 108(7). A groundwater elevation map using the calculated groundwater elevations is shown on Figure 1-11. The groundwater elevation of FTA-108-T24A-G01 was not used because this well is screened much deeper than other wells in the area, and likely represents a deeper groundwater zone. Based on groundwater elevation data in the 18 wells, groundwater flow across the site is to the northwest with a hydraulic gradient of 0.094 feet per foot, generally following the slope of the ground surface. The hydraulic conductivity of the screened formation of monitoring well T24A-G03 (subsequently renamed FTA-108-T24A-G03) was calculated to be 3.04×10^{-4} centimeters per second (SAIC, 1995). This value falls within an established range of hydraulic conductivity for silt and sandstone as reported by Freeze and Cherry (1979).

Based on its location, the splay fault mapped west of Ranges Near Training Area T-24A is suspected to deflect regional groundwater movement to the north following the general strike of the fault. A review of the lithologic log of monitoring well T24A-G01 (Appendix A, subsequently renamed FTA-108-T24A-G01) reveals that the well was completed in a groundwater-bearing fractured zone within the shale. This reported fractured zone may be the subsurface expression of the splay fault; however, because subsurface structural data were not collected at the time the well was installed, the presence of a fault at this location has not been defined. Furthermore, the potential influence of the splay fault on groundwater movement in the vicinity of the Ranges Near Training Area T-24A is unknown.

1.7 Scope of Work

09/28/00 01:35:10
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STARTING DATE: 04/13/00
DATE LAST REV.:
DRAWN BY: D. BILLINGSLEY
DRAFT, CHECK, BY: J. JENKINS
ENGR, CHECK, BY: J. JENKINS
INITIATOR: J. JENKINS
PROJ. MGR.: J. YACOB
PROJ. NO.: 796887
DWG. NO.: ...796887\es.068



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- GROUNDWATER ELEVATION CONTOURS
- (968.47) GROUNDWATER ELEVATION
- G.W. FLOW GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- SURFACE DRAINAGE / CREEK
- FENCE
- UTILITY POLE
- AREAS OF MOUNDS AND TRENCHES
- AREA OF SURFACE MOUNDS
- BEDROCK MONITORING WELL LOCATION
- RESIDUUM MONITORING WELL LOCATION

NOTE:

1. WATER ELEVATION OF FTA-108-T24A-G01 WAS NOT USED IN GROUNDWATER CONTOUR MAP.

FIGURE 1-11
GROUNDWATER ELEVATION MAP
MARCH 14, 2000
RANGES NEAR TRAINING
AREA T-24A
PARCELS 187(7), 112Q, 113Q-X, 213Q
AND 214Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018



The scope of work for activities associated with the supplemental RI for the Ranges Near Training Area T-24A site includes the following tasks:

- Develop the supplemental RI SFSP attachment.
- Develop the supplemental RI SSHP attachment.
- Develop the site-specific UXO safety plan attachment.
- Conduct a surface and near surface UXO survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling activity to determine the presence of potential downhole hazards.
- Install 19 groundwater monitoring wells (9 residuum and 10 bedrock wells).
- Collect 29 surface soil samples, 8 subsurface soil samples, 37 groundwater samples (collected from 18 existing and 19 proposed monitoring wells), 7 surface water samples and 7 sediment samples.
- Samples will be analyzed for the parameters listed in Section 4.5.

The possibility of UXO exists at the Ranges Near Training Area T-24A; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges Near Training Area T-24A. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

At completion of the field activities and sample analyses, draft and final supplemental RI summary reports will be prepared. Reports will be prepared in accordance with current EPA Region IV and Alabama Department of Environmental Management (ADEM) requirements.